What is claimed is:

1. A method for making a microporous crystal comprising the steps of:

a) mixing a polar solute, a silicon or phosphorus source, and a structure directing agent (SDA) to produce a first mixture;

b) mixing at least one surfactant and a non-polar solvent to produce a second mixture;

c) combining said first and said second mixtures to produce a reverse microemulsion;

d) adding a metal source to said reverse microemulsion to produce a third mixture; and

e) adding a mineralizer to said third mixture to produce a fourth mixture.

2. The method of claim 1, wherein the microporous crystal is $AlPO_4$-5 or Silicalite-1.

3. The method of claim 1, wherein the SDA is selected from the group consisting of triethylamine, tetrapropylammonium bromide, tetrabutylammonium hydroxide, morpholine, *N,N*-diisopropylethylamine, di-*n*-propylamine, cyclohexlamine, quinuclidine, 18-crown-6 ether, hexamethonium bromide monohydrate, ethylenediamine, and combinations thereof.

4. The method of claim 1, wherein the polar solute is selected form the group consisting of water, formamid, acetonitrile, dimethyl sulfoxide, and combinations thereof.

5. The method of claim 1, wherein the silicon source is selected from the group consisting of tetraethylorthosilicate, silica, sodium silicate, and combinations thereof.

6. The method of claim 1, wherein the phosphorous source is selected from the group consisting of phosphoric acid, phosphorous pentoxide, and combinations thereof.

7. The method of claim 1, wherein the surfactant is selected from the group consisting of cetyl pyridinium chloride, SDS, n-butanol, isopropyl alcohol, perfluorohexanol, lauric acid, poly(perfluoropropylene oxide) ammonium carboxylate, poly(propylene oxide)-*block*-poly(ethylene oxide), poly(dimethyl siloxane)-*block*-poly(ethylene oxide), poly(tetrafluoro ethylene)-*block*- poly(ethylene oxide) sorbitan monooleate, 3-[(3-Cholamidopropyl)dimethylammonio]-1-propanesulfonate, polyethylene glycol sorbitan monolaurate, and combinations thereof.

8. The method of claim 1, wherein the non-polar solvent is selected from the group consisting of toluene, hexane, perfluorohexane, poly(perfluoropropylene oxide), carbon tetrachloride, iso-octane, compressed ethane, compressed carbon dioxide, and combinations thereof.

9. The method of claim 1, wherein the metal source is selected from the group consisting of aluminum triisopropoxide, aluminum metal, aluminum sulfate, aluminum oxide, gallium sulfate, titanium tetrabutoxide, cobalt nitrate, and combinations thereof.

10. The method of claim 1, wherein the mineralizer is selected from the group consisting of hydrofluoric acid, sodium hydroxide, ammonium fluoride, potassium hydroxide, and combinations thereof.

11. The method of claim 1, further comprising the step of

f) heating said fourth mixture.

12. The method of claim 11 wherein step f) takes place at about 100-220°C.

13. The method of claim 11, wherein step f) takes place at about 180°C.

13. The method of claim 11, further comprising the step of

g) recovering the microporous crystal.

14. The method of claim 13, wherein step g) is accomplished by centrifugation.

15. The method of claim 1, wherein step c) is accomplished by shaking until a clear single phase reverse microemulsion is formed, followed by stirring.

16. The method of claim 15, wherein the stirring occurs for several hours at about room temperature.

17. The method of claim 1, wherein the reverse microemulsion is cooled prior to step d).

18. The method of claim 17, wherein the cooling occurs on ice for about 5-10 minutes.

19. The method of claim 1, wherein said third mixture is aged immediately prior to step e).

20. The method of claim 19, wherein the aging takes place at about room temperature for about 1-3 hours.

21. The method of claim 11, wherein said fourth mixture is aged immediately prior to step f).

22. The method of claim 21, wherein the aging takes place at about room temperature for about 1-3 hours.

23. The method of claim 11, wherein step f) is accomplished by conventional or microwave heating.

24. The method of claim 23, wherein conventional heating takes about 5-7 hours.

25. The method of claim 24, wherein the heating takes place without stirring.

26. The method of claim 23, wherein microwave heating comprises heating said fourth mixture to a temperature of about 100-220°C in about 1-3 minutes; and holding said fourth mixture at the temperature for about 15-20 minutes.

27. The method of claim 1, wherein the microporous crytal is a zeotype crystalline species.

28. A microporous crystal comprising elongated fibers having micropores parallel to the long axis of the fibers.

29. The microporous crystal of claim 28, wherein the fibers aggregate into parallel bundles.

30. The microporous crystal of claim 28, wherein the fibers have dimensions of about 200-300 nm in width and about 15-30 microns in length.

31. The microporous crystal of claim 28, wherein the fibers are a zeotype species.

32. The microporous crystal of claim 28, wherein the crystals are $AlPO_4$-5 or Silicalite-1.

33. The microporous crystal of claim 28, wherein powder X-ray diffraction of the fibers shows greatly reduced intensity of the peak located at a Bragg angle 2Θ of 21.3°.

34. A microporous crystal made by the method of claim 1.